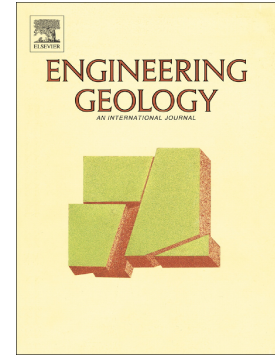


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An estimation of water resources in flooded, connected underground mines

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ABSTRACT

When studying discharges in closed mines with relevant environmental impact, the first step is to undertake a complete hydrogeological study of the mining system. In this study, some inactive and flooded coal mines in NW Spain were characterized. The water resources (recharge) of each mine were evaluated considering the infiltration of effective rainfall over mined areas, the groundwater contribution, and the losses from surface watercourses. The studied mine drainage corresponds to a mining reservoir of 5 connected mines. The resources of this reservoir were estimated in 54 L s^{-1} for an average year, coming mainly from rainfall as well as losses from irrigation systems during the summer. The volume of voids of the reservoir was estimated by using different approaches: the calculation of the void left by the mining activity and the volume of infiltrated water during the mine flooding. In this particular case, the volume of voids below the discharge level (water reserves) are estimated to be around 1 Mm^3 , which makes them useful for storage and regulation of water, as well as for the production of energy. The acid mine water discharge is of poor quality, and affects the receiving watercourses. Strategies, such as the reduction of the mine's water flow, avoiding water level fluctuations, and passive treatment systems could be applied to diminish these negative effects. The methodology explained here is believed to be suitable for application in closed mines where there is not much information available.

Keywords: mining reservoir; flooded mine; mine water discharge; estimation of water resources; coal mines; Spain

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